

**Consolidated Undersea Situational Awareness System (CUSAS)**

# Agent-Based Software Significantly Improves Awareness and Decision Making



## Technology and Innovation

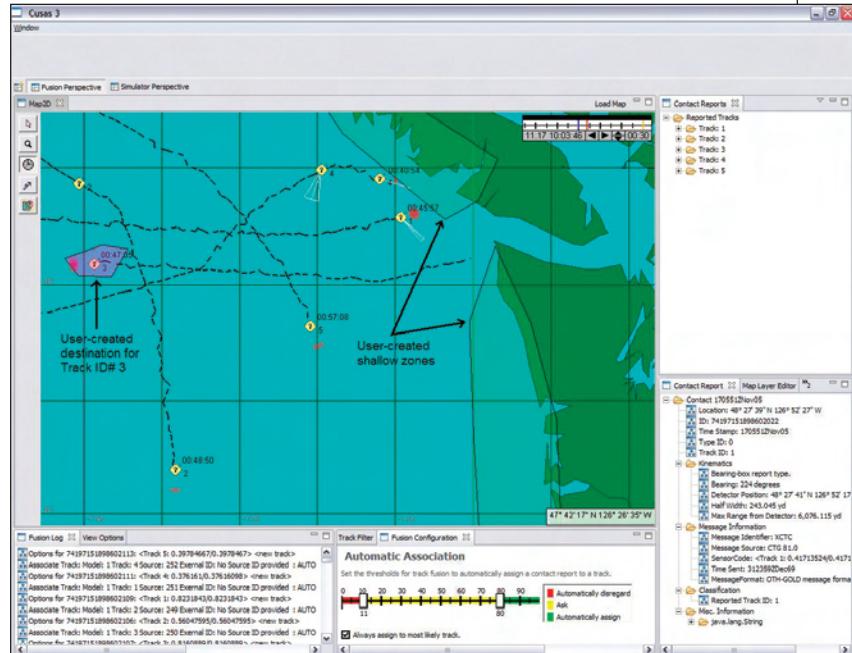
The ability to exercise good judgment requires a keen sense of what's going on around you – situational awareness – coupled with enough information to process, evaluate and choose among alternatives – decision-making.

Under a DARPA SBIR, 21st Century Systems, Inc.® (21CSI®) has developed the Consolidated Undersea Situational Awareness System (CUSAS). This software program monitors and analyzes the environment, and helps users focus on the most important information.

21CSI based this new technology on their own commercial off-the-shelf decision-support software technology, which uses “intelligent agents” that adapt to, respond to, and learn from individual users. It processes and correlates information that originates from multiple sources in multiple formats. CUSAS analyzes data and operator input, alerts the operator of potential dangers, provides notification of specific events, and recommends actions to be taken.

CUSAS provides an integrated, common tactical picture in real time and in the correct format for time- and mission-critical decision-making, incorporating a suite of undersea warfare (USW) tactical decision aid (TDA) toolkits. TDAs under development include:

- A surface track data fusion tool for use by the Pacific Missile Range Facility (PMRF) in merchant vessel range clearing and monitoring



- A modular anti-submarine warfare (ASW) system for use by the Program Executive Office Integrated Warfare System (PEO IWS) Undersea Warfare Decision Support System (USW/DSS) program
- A situational awareness/collision avoidance system for evaluation by the submarine combat system Advanced Processor Build (Tactical) (APB (T)) program.

CUSAS is under consideration to become the principal ASW agent decision support tool for emerging PEO IWS Anti-Submarine Warfare Command and Control (ASWCC2) requirements. Also, the system has implemented a robust collision avoidance tool called “Quarterma\* (Quarter MaStar),” which computes a safe route for transiting into

CUSAS enhances warfighters' awareness and decision-making capabilities by providing real-time, integrated, common tactical pictures

and out of waters of high merchant vessel density and traffic. This tool is being considered for incorporation with emerging submarine collision avoidance radar systems.

## Joint Collaborations

21CSI frequently partners with other technology organizations, major universities and government laboratories to augment its in-house know-how and products and to deliver joint solutions to civilian and military customers.

21CSI is working closely with PMRF and PEO IWS as CUSAS transition sponsors for current and future combat systems.

## Lessons Learned

- Design flexibility into the systems to be able to adapt to changing requirements. Military applications—especially operational ones—can change rapidly.
- Be knowledgeable about current standards and protocols. The system must be compatible with these yet not irreversibly tied to any one. Systems, protocols and standards may change over the course of a project.

## Economic Impact

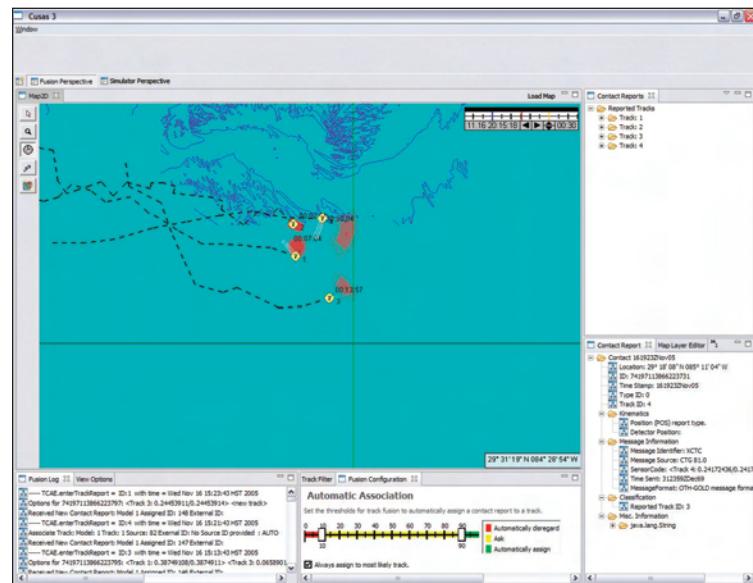
The DARPA SBIR award has opened up a multitude of opportunities for 21CSI, including the ability to expand CUSAS technology beyond its original undersea warfare focus. As a result, 21CSI is participating in the FY06 APB (T), and CUSAS has been awarded another \$2.6 million in research and development funds to further refine its current array of TDAs and develop additional TDAs for possible use in other warfare areas.

## About the Company

Since 1996, when 21st Century Systems, Inc. was founded by Dr. Alexander D. Stoyen, the Arlington, Virginia-based company's primary focus is developing intelligent systems that enhance human decision making.

21CSI's cutting-edge expert technologies have been successfully applied across many missions and environments, ranging from satellites in space and soldiers in the field to submarines and undersea systems.

Since 2001, 21CSI's revenue has increased by 319 percent, and the company has expanded from three offices in three states to eleven offices in nine states. In 2005, the company was identified in the Inc. 500® list as one of the nation's fastest-growing private companies. ■



CUSAS integrates a variety of tools which aid in collision avoidance and in tracking vessels

## Company Information

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